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In Mr. Goff's calculations the cost for labor in making the treatments amounts to more than half the expense.

It seems probable that it would be profitable to make the first application earlier than was done this year, and there is no reason why this application or the next should not be combined with London Purple or some other insecticide, and the tree protected from insects and fungi at the same time. Mr. Hatch closes his report thus:

What we now need is to determine the correct amount of the copper mixture to use, the times best suited to its application, and what combinations to make with insecticides, and a new era in fruit culture will be inaugurated.

NOTES.

By B. T. GALLOWAY.

POWDERY MILDEW OF THE BEAN.

Under date of December 13 Mr. C. N. McCallan, of St. George's, Bermuda, writes that on the 20th of November his section was visited by a very heavy fog, and a few days later he noticed that his crop of six-weeks beans was badly mildewed, the fungus being one of the *Erysipheæ*, probably *Erysiphe communis*, Lév. He immediately gave the plants a thorough dusting with flowers of sulphur, and in a week the fungus had entirely disappeared and the plants produced a good crop. Mr. McCallan was highly pleased with this result, as he has several times lost his entire crop of beans from the attacks of the same fungus. In this country, peas, especially those planted late in the season, are often attacked by mildew, which in all probability might be easily prevented by the timely application of flowers of sulphur or some other fungicide. A powder made by mixing equal parts of air-slaked lime and flowers of sulphur will be found a very good remedy for this disease. The powder should be dusted on the foliage at the first appearance of mildew and the operation repeated every ten or twelve days, or more often if there is an abundance of rain.

If one has a spraying machine a solution made by dissolving 3 ounces of carbonate of copper in 2 quarts of aqua ammonia diluted to 22 gallons will be found an efficient remedy against mildew. This solution should be applied every twelve or fifteen days, beginning at the first appearance of the disease. Three ounces of carbonate of copper can be bought for 10 cents, while the ammonia will cost about 10, making the total cost of the 22 gallons 20 cents; certainly a very cheap fungicide. If carbonate of copper is not obtainable it may easily be prepared by first dissolving sulphate of copper (blue stone) in water and then adding ordinary washing soda. The precipitate formed on the addition of the latter substance is carbonate of copper, and in order to obtain it the liquid only needs to be drawn off and the copper carbonate dried.

RUST OF FLAX.

A short time ago we received from Mr. Frazier S. Crawford, of Adelaide, South Australia, some specimens of flax affected with a fungus, which upon examination proved to be *Melampsora lini*, (DC.) Tul. Mr. Crawford wrote that the parasite had destroyed a crop of flax near Adelaide, and expressed the fear that it would spread and prove a troublesome pest. The fungus has long been known in Europe, where it has occasioned considerable trouble; but so far as we are aware it has not been found on cultivated flax in this country. This seems rather strange considering the fact that it occurs here on quite a number of our native species of *Linum*; but after all an explanation of this may be found in the fact that the fungus is as yet confined to regions where there is little or no cultivated flax grown. We have it from this country on the following hosts:

Linum Virginicum, Decorah, Iowa (Holway).

Linum perenne, Sand Coule, Mont. (Anderson). Flagstaff, Ariz.; and Palisade, Nev. (Tracy).

Linum Lewisii, Spring Hill, Mont. (Anderson).

Linum rigidum, Livingston, Mont. (Seymour).

Linum sulcatum, Armstrong, Iowa (Cratty).

We see no reason why this fungus, if once introduced, would not prove a serious pest to our flax-growers, and until it is shown that it will not attack this crop it would be well to look upon it with suspicion. We have under way some experiments designed to throw some light on the question as to whether the fungus from western hosts will attack cultivated flax, but it is yet too early to speak definitely in regard to them.

NECESSITY FOR A REDESCRIPTION OF THE TYPE SPECIES IN KEW HERBARIUM.

In another part of the present JOURNAL will be found an interesting paper on some of Berkeley's types, by George Massee of the Royal Herbarium, Kew, England. There are over seven thousand type specimens of fungi in the Kew Herbarium, but every mycologist knows that in the majority of cases the descriptions of these are so meager and the figures so inaccurate that it is absolutely impossible to use them in the determination of species. As a result species and even genera are constantly being redescribed as new, thereby adding to the confusion which already exists.

To avoid further trouble of this kind, and at the same time to preserve to the world the valuable material, which however well cared for will eventually through the ravages of time become worthless, it seems to us of the highest importance that the types should be described anew from our present stand-point of knowledge. Such a work, accompanied by good illustrations, would be of untold value to mycologists

everywhere, and we feel sure that we voice the sentiment of all workers in this field when we say that the Kew authorities could not render a better and more highly appreciated service than the carrying out of such an undertaking.

NEW LOCALITIES FOR PERONOSPORA CUBENSIS, B. & C.

In the *Botanical Gazette* for August, 1889, and on page 201 of the present JOURNAL, attention is called to this fungus, the localities for its occurrence being given as Cuba, Japan, and New Jersey. We have recently received it from Anona, Fla., and College Station, Tex. At the former place, according to our correspondent, it appeared in the early part of December and destroyed a large number of cucumber plants growing in the open air in a few days. At College Station it also occurred upon *Cucumis sativa*, but no account of the injury it occasioned was furnished. That it was abundant there, however, is evident from the fact that our correspondent sent us more than 150 good specimens and did not seem to have any trouble in getting them.

REVIEWS OF RECENT LITERATURE.

BEUCKER, GEORGES. *Traitement du Mildiou*. Le Progrès Agricole, 4 août 1889; *ibid.*, 1^{er} septembre 1889.

These short reports coming from the French School of Agriculture recommend strongly to the use of viticulturists a fungicide which has hitherto not been used to any great extent in this country—verdigris, or basic copper acetate. In an experiment extending over three years this fungicide has proved to be, taking all its features into consideration, the most satisfactory among the copper compounds. The chemical itself being a mixture of the normal and bibasic acetates of copper is decomposed by the action of water, and the insoluble bibasic salt precipitated as a light jelly-like substance, which upon being sprayed upon the leaves dries and covers them with a hard horny layer. It is claimed for this solution, made by adding to 6 or 8 gallons of water at the ordinary temperature 2 to 4 pounds of the powdered verdigris and allowing it to stand twenty-four hours before diluting to 22 gallons, that it possesses in a much higher degree than the Bordeaux mixture the quality of adhesiveness, while lacking none of the latter's qualities as a preventive of mildew.

In the report of September the author answers many questions brought out by the former report of August in regard to the nature of the chemical and its proper application, giving in some detail a method for the home production of the basic acetate from the waste *marc*, or pumice of the grape, and small copper plates. The cost of the material is also carefully worked out, calculation being made for labor of